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ABSTRACT

The theme of this report is that recent theory and research related to the cognitive domain of children's comprehension of stories have implications for the social domain of children's understanding of interpersonal interaction, since there are important overlaps between the abilities necessary to comprehend stories about social events and those necessary in actual social situations. The report first discusses overlap at a theoretical level by describing similarities in the processes involved in understanding stories and in understanding social interactions; it concludes that comprehension in each domain involves the ability to make causal inferences among events, a process frequently dependent on the comprehender's prior knowledge about specific actions. It next discusses overlap at a structural level by comparing the event structure of simple stories to that of actual social events, and it shows that event structure has implications for research on the development of social skills as well as for research on the development of story comprehension skills. Finally, the report describes some research that used a storytelling procedure to ascertain children's prior knowledge about one type of social event, friendship. Throughout, the report discusses how such cognitive research overlaps with other efforts to describe and train behavioral characteristics of successful friendship interactions. (Author/GT)

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Technical Report No. 147

CHILDREN'S KNOWLEDGE ABOUT SOCIAL SITUATIONS: FROM CAUSES TO CONSEQUENCES

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Abstract

The theme of this chapter is that recent theoretical and empirical efforts in the cognitive domain of children's comprehension of stories have implications for the social domain of children's understanding of interpersonal interaction. While the abilities necessary in actual social situations may differ markedly from the abilities necessary to comprehend stories about social events, there are some important overlaps that are worth exploring. In the first section of this chapter, we discuss overlap at a theoretical level by describing similarities in the processes involved in understanding stories and in understanding social interactions. Our conclusion is that competent comprehension in each domain involves the ability to make causal inferences among events. This inferential process frequently depends on the comprehender's previously acquired knowledge of the possible reasons for a specific action and of the result(s) of a specific action. Next, we discuss overlap at a structural level by comparing the event structure of simple stories to that of actual social events. Event structure is shown to have important implications for empirical research on social development and the development of social skills as well as for the development of story comprehension skills. Finally we describe some research that employs a story-telling procedure to ascertain children's prior knowledge about one type of social event, friendship. Throughout, we discuss how such cognitive research overlaps with other efforts to describe and train behavioral characteristics of successful friendship interactions.

Children's Knowledge about Social Situations: From Causes to Consequences

The Nature of the Understanding Process

Theoretical accounts of the acquisition of knowledge and the process of understanding highlight the importance of what an individual already knows at the time he attempts to understand an environmental event. There is theoretical consensus regarding the general nature of this process. The following is a summary of proposals made by a diverse group of psychologists (e.g., Piaget, 1971; Brown, 1975; Greeno, 1977; Newell & Simon, 1972; Anderson, 1978; Rumelhart, 1977a; Bransford & McCarrell, 1974).

The general process of understanding involves the interaction between previously acquired knowledge systems and the information structure of the new event. The product of this interaction is an internal representation of the event. Previously acquired knowledge systems are assumed to guide the construction of meaningful internal representations of the new event. For the new event to be meaningful there must be consistency between the previously acquired knowledge systems and the additional information in the knowledge system. The understander's attempts to achieve consistency may produce changes in the organization of the knowledge system as well as changes in the content of the knowledge system. Although the operation of this process has not been specified in detail, an analogy has been drawn between the process of constructing a meaningful representation and scientific hypothesis testing: initial hypotheses about meaning are successively revised,

expanded, and restructured until the resulting representation seems to account for the new information (Rumelhart & Ortony, 1977; Rumelhart, 1977a; Brown, Collins, & Harris, 1978).

Research in a number of areas in psychology suggests the usefulness of this general framework in investigating the processes of knowledge acquisition and understanding (e.g., Piaget & Inhelder, 1969; Greeno, 1977; Kintsch, 1977; van Dijk, 1977). The framework points to the importance of characterizing both the information structure of the material to be understood and of the knowledge systems of the understander, regardless of whether the material is a story or an actual social event. This theoretical overlap between stories and social events can be elaborated in two ways. First, we will describe the application of this framework to story comprehension processes. Then we will illustrate that previous theoretical accounts of how we understand the behavior of others rely on assumptions that are virtually identical to those of the present framework.

Story Comprehension Processes

Story understanding is assumed to involve the construction of a coherent, meaningful representation of the story (Kintsch & van Dijk, 1978; Anderson, 1978; Rumelhart, 1977a). The construction of such a representation involves processes that operate on a number of different kinds of information in the story. These processes interact with one another and with previously acquired knowledge about each of these kinds of information (cf. Perfetti & Lesgold, 1977; Frederiksen, 1977; Kintsch & van Dijk, 1978; Rumelhart, 1977a). Successful

comprehension seems to require knowledge of a number of different kinds, including knowledge of the grammatical structure of stories and of information relevant to the content area of the story. For stories containing problem solving episodes, Brown, Collins, and Harris (1978) suggest that the result of the process is a "deep structure trace that is a complex hypothesis about the plans and goals of characters in the text." The source of these hypotheses is the comprehender's ability to simulate the problem solving in which the story character is engaged, and this ability depends on previously acquired problem solving strategies.

Thus, one domain of knowledge that successful comprehension seems to require is that of problem solving in social situations. Furthermore, the content of stories written for children, and of those produced by children, often focuses on goal-directed behavior, particularly goals that occur in social and interpersonal contexts (cf. Botvin & Sutton-Smith, 1977; Stein & Glenn, 1979; Applebee, 1978). Examples of common themes are friendship, obedience, and the solution of a particular personal or interpersonal problem. The content of such stories typically deals with the reasons for setting realistic goals and successful and unsuccessful plans for attaining such goals. Therefore, the child who attempts to understand such a story needs to rely not only on knowledge of the grammatical structure of stories but also on his/her expectations regarding social interactions and problem solving.

Comprehending the Behavior of Others

Social interactions obviously involve more than one person. This implies that in understanding social interactions one must comprehend the behavior of

others as well as the behavior of oneself. There have been a number of theoretical accounts of how we understand the behavior of others (e.g., Heider, 1958; De Charms, 1968; Jones & Davis, 1965; Kelley, 1973). These accounts share an assumption that is consistent with the previously described general framework for understanding. The common assumption is that we understand the behavior of others with respect to our understanding of our own behavior. We use our knowledge of why we would engage in a particular action to construct hypotheses about why the other person is engaging in that action. The information structure of the other person's behavior is interpreted with respect to the understander's previously acquired knowledge of his own behavior.

An important characteristic of intelligent human behavior is that it tends to be intentional or goal-directed (Piaget, 1968) and often involves the construction of plans. This kind of knowledge of our own behavior has been assumed to play a central role in our attempts to understand the behavior of others. For example, a basic axiom of Heider's Common Sense Theory of interpersonal understanding, the axiom of personal causation, states that the observer assumes that an actor's voluntary actions "imply the existence of a plan that the actor has chosen to try to execute and also believes can be carried out" (Schmidt, 1976, p. 51). In other words, the ability to understand the behavior of another person depends on the ability of the observer to understand his own plans and intentionally based actions. This process is similar to the comprehension process of simulating a story character's problem solving behavior.

Therefore, theoretical accounts of comprehending stories and of comprehending the behavior of others share a common assumption: an individual's actions are normally understood to be motivated or intentionally based. The power of this assumption is twofold. First, it allows the prediction and explanation of certain classes of causal inferences that are made between story events. Second, it allows the prediction and explanation of an observer's attributions of intentionality, evaluations, and moral judgments of the actions of others. The acquisition and development of knowledge about interpersonal interactions and problem solving in social situations is important for both models of story comprehension and for models of social development. Furthermore, analytic tools that have been developed within the domain of story comprehension can be profitably applied to the analysis of the structure of actual social interaction events. We will devote the next section to a discussion of one such analytic tool, the story grammar, and illustrate how the basic structural components of a simple story are similar to the elements of an actual social interaction or observed action sequence. The discussion also points out some important differences in the information normally available in a story versus that in an observed action sequence.

Story and Social Event Structure

The Structure of Simple Stories

There have been a number of theoretical analyses of the structure of stories and/or action narratives (e.g., Rumelhart, 1975, 1977b; Mandler & Johnson, 1977; Stein & Glenn, 1979; Kintsch, 1977; van Dijk, 1977). These

analyses specify a set of grammatical categories and rules for combining and ordering these categories. The categories may contain certain kinds of content. The theoretical status of the categories and the content description may be understood by analogy to sentence grammars. Sentence grammars specify rules for combining different parts of speech. For example, an adjective may precede but not follow the noun that it modifies. Each part-of-speech denotes a particular kind of content, e.g., a noun is a person, place, or thing. We will refer to the "parts-of-speech" of a story as syntactic categories. The classes of information that may occur in these categories will be referred to as semantic or content information. The following description of the grammar of a simple story is a summary of the previously mentioned work and is typical of stories and folk tales.

A simple story has been postulated to contain two higher order syntactic categories, the setting and the episode. The content of the setting typically introduces and describes the protagonist and the social, physical, and cultural context of the rest of the story. The episode consists of a number of syntactic categories that are logically and causally related to one another. The information in the episode generally describes a change or conflict that leads to conflict resolution. These conflicts may be intrapersonal, interpersonal, or both. In the following example, the first three sentences convey setting information and the remainder of the story is the episode.

> This story is about a boy named John who lives in the city. John is nine years old. He lives in an apartment with his mother and father.

One day, John's best friend, Paul, didn't want to play with John. John felt sad and lonely and wanted Paul to play with him. John knew how much Paul liked ice cream.

So John bought an ice cream cone for Paul. Then John said, "You can have this ice cream cone if you will play with me."

Paul said, "Okay."

John and Paul played together all afternoon and they both had a good time.

In this story, the conflict is interpersonal and is resolved by John's successful attempt to convince Paul to play with him.

The episode is defined by five syntactic categories that typically occur in the following order: Initiating Event, Internal Response, Attempt, Consequence, and Reaction. The Initiating Event signals a change in the story environment that was established by the setting. Information in this category describes an event that causes the protagonist to generate a goal. In the above example, Paul's not wanting to play with John causes John to have the goal of wanting to get Paul to play with him. Paul's behavior may be said to motivate John's goal formulation. The protagonist's goal formulation is one kind of information that may occur in the Internal Response category. Additionally, the Internal Response encompasses emotional reactions to the Initiating Event, e.g., sadness and loneliness, degree of commitment to the goal, and thoughts about how to attain the goal. Goal formulation causes an Attempt to attain the goal, a series of overt actions carried out to achieve the goal.

In the example, John buys an ice cream cone and then offers it to Paul if Paul will play with him. The Consequence category provides outcome information, i.e., whether the attempt led to goal attainment. In the example, Paul agrees to play and then Paul and John play. Finally, the Reaction category describes the protagonist's response to the Consequence (how he feels about it or what he thinks about it) or broader consequences of goal attainment (how other story characters felt or acted in response to the protagonist's goal attainment). In the above example "they both had a good time" is the Reaction. However, we might expand the Reaction to include "Paul knew he had been taken but he didn't care." A grammatically well-formed story has been postulated to include these syntactic categories in the sequential order in which they were presented.

Empirical evidence suggests that grammatical well-formedness does affect story understanding, and that these proposals are reasonable models of the major syntactic categories. For example, recall and summary protocols of adults tend to contain these syntactic constituents (Kintsch, 1977; van Dijk, 1977; Kintsch & van Dijk, 1975; Rumelhart, 1977b; Mandler & Johnson, 1977). Furthermore, reading time, summary, and recall data show that adults do expect these categories to occur in this hypothesized sequence. It takes adults longer to read and to summarize scrambled stories than stories which conform to the hypothesized sequence (Kintsch, Mandel, & Kozminsky, 1977). Additionally, if presented with stories in which the category ordering violates the hypothesized sequence, adults tend to reorder the categories and recall a grammatically well-formed story (Stein & Nezworski, 1978).

In general, similar findings have been obtained with children, but there are some developmental differences in the importance of these categories. For younger children (age 6-7), settings, Initiating Events, and Consequences are more frequently recalled than Attempts while for older children (age 9-10) Attempts are recalled equally well (Mandler & Johnson, 1977; Stein & Glenn, 1979). Furthermore, younger children tend to rank the Consequence as more important than the Initiating Event while the reverse is true for older children (Stein & Glenn, 1979). Like adults, children demonstrate better retention of information when the hypothesized logical sequence of the categories is preserved (Stein, 1978). Deletion of major categories, especially the Initiating Event, negatively affects recall but increases the addition of non-presented information: children tend to add information that could occur in the missing category (Stein, 1979, Note 1).

The syntactic category analysis and grammatical structure of stories is relevant to work in the area of social development for at least two reasons. First, stories have often been used as the medium for presenting information from which a child is to make evaluative inferences. Second, social skills training studies often use stories and films that contain the episodic structure outlined for the simple story. We will discuss each of these in order to illustrate that a better understanding of the episodic event structure of stories and films can lead to a better understanding of the acquisition of knowledge about social events and of the outcomes of social skills training procedures.

Stories as the Medium for Presenting Behavior

The purpose of this section is to illustrate that the results of empirical research on the acquisition of various social cognitive abilities depend on the grammatical structure of the stories that have been used in such studies. Recent reviews of the research in the area of evaluative inferential reasoning (Shantz, 1975; Grueneich & Trabasso, in press) have pointed out that there is considerable variability in the presentation of information thought to be important in such reasoning. The presentation of motive, or intention, and outcome, or consequence, information frequently varies in terms of location in the story and in terms of the explicitness of such information (Grueneich & Trabasso, in press). For example, motives are often implicit in the story and must be inferred from story statements about the character's goal, actions, consequences of his actions, and/or the reactions of others. This is an important factor because empirical evidence has shown that conclusions about whether or not young children use motive information in their evaluative inferences depends on the explicitness of motive information (Bearison & Isaacs, 1975; Berg-Cross, 1975). In addition, Nezworski, Stein, and Trabasso (1979) have recently shown that if motive information, e.g., giving a birthday present to someone, is explicit in the story, the importance of the location and syntactic category of the information decreases, although it does not disappear. These data suggest that if the critical information is explicit in the story and the story is grammatically well-formed, children have little trouble comprehending goal-directed behavior and then making evaluative inferences about that behavior.

However, if a story is not grammatically well-formed because it is missing a major syntactic category, children tend to add to the content of the story (Stein, 1979, Note 1). A common method of assessing one type of evaluative inference, moral judgments, is to present stories that lack a conclusion or consequence. The child's level of moral development is then inferred from the type of consequence the child proposes in conjunction with his reasoning about this story conclusion (e.g., Selman & Byrne, 1974; Damon, 1975). These moral dilemmas require children to add to the content of the story and complete the grammatical structure. The sophistication of moral reasoning may be limited by the nature of this added content. There may also be developmental differences in the ability to anticipate alternative possibilities for the outcome of these dilemmas and this ability may affect the nature of children's moral judgments.

Our contention, then, is that many stories that have been used in investigations of evaluative inferences require that the child not only make inferences among story events, but also add to the content of the story. Developmental differences arise not only because of possible differences in the use of presented information but because of differences in the nature of children's elaborations of the content and structure of the story. These differences are related to children's preexisting knowledge of story structure, of the social situations described in the stories, and their ability to make their experiential history relevant to this new event. From both the standpoint of models of story comprehension and from that of social development it is important to describe developmental changes in the knowledge children have acquired about

social situations. This knowledge is a primary determiner of the content of their inferences and their evaluations. In order to be able to predict the types of content inferences and evaluations that children will make, we need to have a better idea of what types of motives children associate with different types of goals, what actions and alternatives they view as leading to goal attainment, and what outcomes they foresee for particular actions. Goldman (1978) has attempted to examine these questions for social situations involving friendship. However, before discussing this work, we will discuss the second reason that episodic structure is relevant to social development.

Episodic Structure, Stories, and Social Skills Training

The second reason that story research and the concept of episodic structure are relevant to social development is that social skills training studies often use stories and films that contain an episodic event structure similar to that of the simple story. The purpose of this section is to illustrate that understanding episodic structure can lead to a better understanding of the outcomes of social skills training procedures. One aim of many social skills training studies is to encourage children to make inferences about the motives, intentions, and feelings of the people involved in actual social events (see Asher & Renshaw, in press). Films can be very much like actual social events in that a character's thoughts must be inferred from his overt actions and from facial expressions. In contrast, the episodic structure of a well-formed story includes information about the reasons for the protagonist's actions.

The difference between films and stories has important implications for social skills training procedures because empirical evidence suggests that there are developmental differences in the nature of the inferences children make about characters in flims (e.g., Flapan, 1968) and a developmental progression in the strategies children use for making inferences about characters who display diverse behavior (e.g., Gollin, 1958). Flapan, for example, has found developmental differences in the types of inferences children make when asked to explain the behavior of the characters in a film that had a problem solving episodic structure. Twelve year olds explained the behavior of the characters using situational, psychological, and interpersonal reasoning while nine year olds used situational and psychological explanations and six year olds used mainly situational reasoning. Situational reasoning refers to the concrete events and actions that were featured in the film while psychological reasoning referred to the thoughts a particular character had and interpersonal reasoning to thoughts about others' thoughts.

Filmed episodes have also been used to examine developmental changes in strategies for evaluating characters who exhibit inconsistent behavior. Gollin analyzed children's descriptions of a protagonist who engaged in socially approved actions and socially disapproved actions. He proposed a developmental sequence of strategies that children use for making judgments after witnessing such diverse behavior: (a) delete divergent qualities, (b) describe actions and make inferences based on a single aspect of behavior, and (c) make inferences aimed at justifying divergent actions. In Gollin's sample of 10 to 17 year olds, the younger children tended to use the first

procedure while the older children tended to employ the more inferential procedures. Stein (Note 1) has found a similar developmental progression in the strategies children use when recalling stories that contain characters who behave inconsistently. First graders tend to delete character descriptions that are incongruous with the character's actions while fifth graders tend to add information that justifies the character's incongruous behavior.

A major difference between the findings of Gollin and of Stein is the age at which a particular strategy was used rather than the developmental sequence of strategies for dealing with the inconsistencies. A possible explanation for this difference highlights an important difference between films and stories: character evaluations may be easier to make in the story context than in the film context because stories can explicitly state information that must be inferred in films. Stories may be easier than films because the causal connections among motives for behavior, goals, subsequent actions, and outcomes can be made explicit whereas they are often implicit in film and in actual social events. This characteristic of stories as compared to films and actual social events makes stories effective instructional tools in social skills training. For example, a story can state a protagonist's goal explicitly and the actions he took may be purposively connected to that goal, as is illustrated in the following: "John wanted to be friendly so he went to the playground and played with some boys." The story states the reason for John's action of going to the playground. In a film or actual social event, it is likely that we would have only John's action as the basis for our inference about his motive. In fact, Asher and Renshaw (in press) suggest

that the success of at least one social skills study that used a film (O'Connor, 1969, 1972) may have been due to the verbal narration that accompanied the film. From our perspective, the verbal narration of this film (Gottman, cited in Asher & Renshaw, in press) functioned to make explicit the goals, thoughts, and affective reactions of the characters in the film and the causal connections between these internal states, the character's overt actions, and the consequences of that behavior. We would further expect that other types of social skills training procedures will be effective to the degree that causal connections among motives, goals, actions, and outcomes are made explicit. However, the theoretical perspective outlined in the first section of the paper carries with it an important qualification: optimal intervention procedures are those that achieve a balance between new content information and its organization and the child's preexisting conceptual knowledge and its organization (e.g., Brown, 1975; Glaser, 1976).

Thus, if one wants to teach children how to be friendly, it is important to first assess the child's understanding of friendship, including the ways he knows to be friendly. Such an assessment might show that the child knows many ways to be friendly but not the context in which the action will lead to the desired outcome. Asher and Renshaw's analysis (in press) of why social skills training is effective includes the possibility that children do not lack social skills but rather the knowledge of when particular social skills are appropriate. Knowledge of when particular social skills are appropriate encompasses other aspects of the concept of friendship, most

importantly the child's concept of the conditions under which one might want to be friendly. The use of an action or social skill that will result in friendship presupposes that the child wants to be friendly. It would be informative to know if children who differ in terms of their popularity also differ in terms of the personal and social situations in which they formulate the goal of wanting to be friendly. There is the possibility that children who are isolated differ from children who are popular with respect to their reasons for wanting to be friendly. There is the further possibility that these children differ in terms of the goals that they formulate in response to similar motivating states. For example, a popular child who is lonely might formulate a goal of wanting to be friendly. In contrast, an isolated child who feels lonely might formulate a goal of wanting to be alone. These different goals would lead to the appropriateness and utilization of different actions, independent of other differences between these two children. Therefore, descriptive accounts of children's understanding of the reasons for wanting to be friendly, in addition to their understanding of the actions that constitute being friendly would be helpful in understanding the dynamics of popularity and isolation. A first step toward such a descriptive account is discussed in the next section.

Children's Knowledge of Friendship

Goldman (1978) examined children's understanding of friendship by asking them to talk about their reasons for wanting to be friendly or unfriendly, actions they could take to attain each of these goals, and the conditions that could prevent them from attaining each goal. Goldman's primary concern was

with describing the information and the organization of the information that constitutes conceptual knowledge of friendship for children of different ages. While this research does not deal with popularity differences among children, the methods used for data collection and analysis can be extended to questions regarding such individual differences. Furthermore, the developmental differences that were found may help to explain previously reported age differences in the effectiveness of certain social skills training procedures, results reviewed by Asher and Renshaw (in press) and Putallez and Gottman (in press).

Children's knowledge of friendship was inferred from the language they used in talking about friendship. Previous research has investigated the language children used to describe their friends (Peevers & Secord, 1973; Livesley & Bromley, 1973) and their expectations about their best friends (Bigelow, 1977). These descriptions have shown: (a) There are developmental changes in the personality attributes that are salient to children (e.g., Livesley & Bromely, 1973). (b) There are developmental changes in children's descriptions of what they expect their best friends to be like but there is also agreement that a best friend should provide ego reinforcement and reciprocity of liking (Bigelow, 1977). Both of these types of studies index part of the child's concept of friendship since they focus on properties of the other person. They do not, however, inquire about the child's own role in the interaction. The present research uses children's verbal descriptions of their own role in solving problems involving friendship in order to examine the nature of conceptual knowledge of friendship and developmental changes in this knowledge. Despite the focus on the child's own role, all children also gave their friends a role to play in these problem solutions.

The problem solutions children were asked to construct involved two types of goals: wanting to be friendly and not wanting to be friendly. In order to help the children organize their comments, two types of tasks were included in the interviews: a story-telling task and a probe question task. In the story-telling task, children were asked to produce a story in which they were the protagonist and had a particular goal that they met. Instructions for the Want-to-be-friendly condition were the following:

> I want you to make up a story today. The story is about you. Suppose one day you decided, "I want to be friendly." Tell me a story where you want to be friendly and are friendly.

Following the production of the story, a series of probe questions were asked. These questions were used to: (a) help minimize the effects of developmental differences in productive language skills on conclusions about the child's knowledge of friendship; (b) systematically elicit further discussion from the children about reasons for wanting to be friendly, the actions they would take to be friendly, and the conditions they could anticipate that might prevent them from being friendly. The same instructions and set of probe questions were repeated at another point in the interview for the Not-want-to-be-friendly goal condition.

Thus, the story-telling instructions gave setting, Goal, and Consequence information that had to be included in the story, and the probe questions directly requested content that could occur in other categories of the episodic structure of stories and social events. Reasons for setting the goal, or Motives, typically occur at the beginning of a story and convey Initiating

Event information. Motives are causes of goal formulation. Actions, or Attempts, convey information about how the protagonist solves the problem that was set up in the Initiating Event. Attempts are causes of goal attainment, i.e., the means to the end. Conditions that might prevent goal attainment, or Obstacles, typically occur as the Consequence of an action and often lead to additional Attempts to meet the goal. There is, therefore, a causal relationship between information in each of these three categories and either the Goal or the Consequence of the problem solution. The selection of these specific causal relations and the rationale for the form of the interview were based on analysis of previous proposals regarding problem solving (e.g., Klahr, 1978; Simon, 1975) and on previously reported developmental changes in the form of children's verbal narrations (Glenn & Stein, 1979; Menig-Peterson & McCabe, 1978).

Ten boys and ten girls at each of three age levels (6, 9, 12 years) were interviewed. The rationale and additional procedural details are more fully described in Goldman (1978). The interviews were tape recorded and later transcribed. A content analysis was then done on the information in the protocols. The analysis of the protocol content involved classifying the statements in each child's protocol into a number of categories that represent different aspects of problem solving in social situations. The categories should be understood as plausible classes of conceptual knowledge relating to goal attainment in realistic, everyday situations. The categories that were used to classify information about friendship are shown in Table 1. Three major classes of information are represented: information about the protagonist,

about the role of other people, and about aspects of the external environment. Within these major classes, a number of component categories were distinguished.

Insert Table 1 about here

As can be seen in Table 1, the first major class is Protagonist's States and Actions. Statements from the children's protocols were classified into one of the categories in this class if the statement described the protagonist's, i.e., the child's, internal states or overt actions. The categories distinguish among types of internal states and specific overt actions. Four internal states were distinguished: physical, affective and emotional, situational, and attitudinal. Statements were classified as situational states if they described other goals and ongoing activities that were concurrent with the friendship goal. Statements were classified as attitudinal states if they described feelings and attitudes toward friendliness, toward prospective friendship objects, or toward anticipated outcomes of being either friendly or unfriendly. Examples of each of these are, respectively, "It's nice to be friendly," "She looked like a nice kid," and "(I wanted to be friendly) so people would like me." The specific action category covers statements that describe friendly or unfriendly overt actions, including both direct actions and verbal actions. This category represents specific ways to be friendly, e.g., helping, sharing, playing, telling that you like him, or unfriendly, e.g., hitting, not helping, teasing, calling names. All of the categories in the first major class refer to some aspect of the child's own role in the friendship situations.

The second major class refers to the role of other people in friendship situations. Statements from the children's protocols that referred to the

ways in which other people were involved in the friendship interaction were classified into this major class. In classifying statements into this class, no distinction was made among statements that described the direct actions, the verbal actions, or the internal states of others. Rather, the categories within this class distinguish among the type of person that was involved. The first category refers to the role of parents and family members. The second category refers to the role of people outside of the friendship interaction and outside of the family. Peers not directly involved in an interaction can still have an effect on the protagonist's behavior. A statement illustrative of this component is "(I didn't play with her) because my other friends would laugh at me if I did." Statements that referred to the role of the person directly involved in the dyadic friendship interaction, the friendship object, were classified into the third category, e.g., "(I couldn't be friendly with him) because he always hit me," and "He was nice to me." Note that if the child's statement referred to a group of friends with whom he was interacting, the statement was classified into the category of Role of Friendship Object, e.g., "My friends wanted me to play ball with them." The second major class, then, refers to the role played by other people. However, the child and these other people exist in some environment, and the characteristics of this environment also affect friendship interactions.

The third major class refers to the role of the environment. In order for a friendship interaction to occur, the environment has to be conducive to such an interaction. The categories within this class distinguish among the availability of different types of environmental resources. Statements that

referred to the presence or absence of potential friendship objects were classified into the category Availability of person to be friendly with. An example statement is "There were lots of kids my age." Furthermore, the child's attempts to meet a new person were also scored in this category, e.g., "I asked him his name," and "I said 'Hi'." These statements are similar to previous reports of the types of actions children propose as ways to make new friends (Gottman, Gonso, & Rasmussen, 1975). The second category, Availability of a basis for friendship interaction, refers to statements that describe an awareness of the need to agree on a common activity or attempts to establish a common interest or activity. Examples are: " I wanted to be friendly with him because we both like to play football," and "I asked him if he wanted to play what I was playing." The final category, Availability of a common location, refers to the fact that the participants in an interaction must be in proximity to one another, e.g., "I went up to his house," and "I called my friend on the telephone."

To reiterate, these categories represent different aspects of problem solving in friendship situations. Children's knowledge of these aspects of friendship was inferred from the results of classifying the statements in their protocols. Reliability in scoring the protocol statements was 90% (Goldman, 1978). Once the statements were classified, two questions were of primary interest. The first question was whether there were developmental differences in the content of the knowledge base, i.e., in the set of categories of knowledge associated with friendship. The second question was whether there were developmental differences in the organization of the

knowledge base, i.e., in the type(s) of causal relation associated with a particular category and the goal situation.

In order to address these questions, the results of the statement classification were summarized (scored) in two ways. To answer questions associated with the content of the knowledge base, a child received credit for a particular category if it occurred during any part of the interview and the causal relation of the category to the goal was ignored. The causal relation was considered when the organization of the knowledge base was examined. For example, a child could give the statement "I like him" as both a Motive for being friendly and as an Obstacle to not being friendly. For purposes of the knowledge base content analysis, he received the same credit as a child who gave the statement only as a Motive for being friendly. However, in describing the organization of the knowledge base, the first child received credit for both Motive and Obstacle relations while the second child only received Motive relation credit.

Content of the Knowledge Base for Friendship Interactions

A knowledge base is the set of information that an individual has acquired. A particular child's knowledge base for friendship interactions was described by the set of categories of conceptual knowledge that was inferred from the classification of his protocol statements. Within each grade, certain categories were present in the knowledge base of at least 90% of 18 of the children. These were labeled Core categories. Other categories occurred in less than 80% of the children's protocols and these were labeled Non-Core categories.

One way to talk about the content characteristics of the knowledge base for each age group is to consider those categories in the Core subset and those in the Non-Core subset. The Core subset is a highly frequent pattern of information within an age group. By considering the co-occurence of Non-Core categories with the Core subset, we can augment the description of the set of information that constitutes the knowledge base for an age group. Developmental changes in the knowledge base can be described by comparing Core subsets and Non-Core subsets across age groups.

The knowledge base for friendship interactions for each age group is shown in Table 2. Developmental changes in the knowledge base were elaborative and systematic. The elaborative nature of developmental changes is illustrated by the categories in the Core subset. For the oldest children, the Core subset includes all of the categories that are in the Core subsets of the nine and six year olds. The Core subset of the nine year olds includes all the categories that are in the Core subset of the six year olds. Within each age group, Core includes the Protagonist's specific actions, his Feelings about the friendship interaction, and the Role of the friendship object. Within the two groups of older children, Core also includes information about the Availability of a common location, i.e., of being in proximity to someone to be friendly with. Only with the oldest children does Core include information about establishing a basis for a friendship interaction, for example, "I asked him if he liked to play football." This implies an increased awareness of the notion that shared interests facilitate the establishment of friendship and that the interests of others may differ from those of the self.

Younger children may know that you play with a friend but are less aware of the need to match or establish common interests. For the oldest children Core also included the Protagonist's situational state, i.e., other goals the protagonist has and other activities in which the protagonist might be engaged. This implies increased awareness that friendship may conflict with an individual's independence.

Insert Table 2 about here

The Core subset represents the information that most children within an age group have acquired. What most older children know about friendship was found to be additions to what most younger children know. The acquisition of these additions seems to be systematic. This is illustrated by the likelihood that a Non-Core category co-occurs with the Core subset, reported in the lower half of Table 2. The critical data is that the most frequently co-occurring Non-Core categories within each of the younger groups are precisely those categories that are part of the Core subset for the next oldest group. For example, the Core subsets of the nine and twelve year olds differ by two categories, Availability of basis for friendship and Protagonist's situational state. For the nine year olds, the probability that each of these categories co-occurs with the Core subset is .74 and .68, respectively, and higher than that probablities associated with any of the other Non-Core categories. Similarly, the difference between the Core subsets of the nine and six year olds is Availability of common location. For the six year olds, the probability is .61 that this category will co-occur with the Core subset. Thus, the acquisition of knowledge about friendship interactions seems to proceed in a systematic as well as an elaborative fashion.

One final aspect of the developmental changes in knowledge base content has implications for social skills training research. Within an age group, individual differences among age mates decrease as age increases. This is illustrated by the changes across age in the number of categories that meet the criterion for Core information. This point is further illustrated by the presence of a smaller range in the co-occurrence probabilities associated with the Non-Core categories for the older age groups. For example, over 60% of the twelve-year-olds mention the same information, with the exception of Protagonist's physical state. In contrast, there is much less agreement among the youngest children, range .17 to .67. What a younger child knows about friendship would seem to be less predictable than what an older child is likely to know. A relationship between differences in conceptual knowledge about friendship and differences in popularity might be more likely in younger than in older children. Asher and Renshaw (in press) report that certain social skills training procedures have been effective with younger but not with older children. A possible explanation of this finding is that the cause of isolation or low popularity for younger children is different from that of older children and related to changes in variability in the knowledge base. Older children, regardless of popularity or isolation, may share the same knowledge base for friendship while for younger children differences in the knowledge base may be correlated with differences in popularity. An appropriate focus for social skills training with older children might be on the utilization of knowledge in different group contexts (see Putallaz & Gottman,

in press). A more appropriate focus with younger children may be on the acquisition of knowledge about friendship.

However, as we noted previously, optimal intervention requires specification of what the child knows plus the specification of how that information is organized. The organization of information in the knowledge base for friendship interactions describes the relevance of the various categories of knowledge to three aspects of friendship: (a) Motives for being friendly or unfriendly, (b) Obstacles to being friendly, (c) Attempts or ways to be friendly or unfriendly. As discussed above, descriptions of information organization may lead to better understanding of children's comprehension of actual social events and stories about social events by allowing the prediction of the types of content and evaluative inferences children will make.

Organization of the Knowledge Base for Friendship Interactions

During the comprehension of episodically structured information, children must frequently make inferences about why particular actions occur. Our assumption is that a primary source for making such inferences is the child's previously acquired knowledge about the event, including what he knows about the reasons for formulating goals, ways to achieve particular goals, and conditions that might prevent goal attainment. Developmental differences in inferential reasoning may arise from differences in the way the contents of the knowledge base are organized as well as from differences in the contents per se. One way to talk about the organization of the knowledge base is in terms of the causal relation associated with particular content. Goldman (1978)

examined the previously discussed content categories in terms of three causal roles in friendship interactions: (a) Motives are causes of goal formulation. (b) Attempts are causes of goal attainment. (c) Obstacles are causes of failure to attain the goal.

There were differences in the categories of information associated with each causal relation. These differences are informative in that they describe children's expectations about the content of Motives, Obstacles, and Attempts involved in friendship interactions. The mean probabilities of associating each category of information with each causal relation are shown in Table 3. Protagonist's physical, emotional, and situational states and his feelings toward the friendship interaction tend to motivate goal formulation, are occasionally Obstacles to goal attainment, and are rarely associated with Attempts to attain the goal. Not surprisingly, the Protagonist's specific actions are always associated with the Attempt. The role of other people in the friendship interactions varies with the identify of the other. Parents and family members are associated with motivating conditions while non-dyad others (peers not involved in the particular interactions) are associated with both Motive and Obstacle relations. The friendship object's role is associated with all three types of causal relations. Finally, the role of the environment is associated almost exclusively with Attempts to be friendly or unfriendly.

Insert Table 3 about here

Thus, children's view of their own role in a friendship interaction is that their own thoughts and feelings can motivate them to be friendly or

unfriendly, and there are specific actions that they can take to accomplish their goal. Few children see themselves as causing their own failure. However, the friendship object is seen as a potential Obstacle to goal attainment. In addition, the friendship object shares the motivating and Attempt role that the child associates with himself. People outside of the friendship interaction are seen as motivators of friendly or unfriendly interactions and as Obstacles to the child's goal attainment. Finally, Attempts to attain friendship interactions involve satisfying the environmental conditions of friendship.

One other aspect of these data is of particular relevance to social skills training research and attempts to train problem solving skills. There was a great deal of consistency within the sample with respect to the types of information associated with causes of goal attainment. In contrast, there was a great deal of variability in the types of conditions that were seen as Obstacles to goal attainment. One indicator of social adjustment is the number of alternatives children produce to solve a particular problem (Spivack, Platt, & Shure, 1976). However, Ladd and Oden (1979) have not found a positive relationship between the number of ways children report to be helpful and sociometric ratings of popularity. The present data indicate that there may be potentially important individual differences in the nature of anticipated Obstacles that would make alternative solutions necessary in the first place. It may be that the ability to foresee potential reasons for failing to be friendly or popular is a more important predictive factor than is the ability to list a number of ways to be friendly.

In general, developmental differences in the organization of knowledge bases for friendship interactions were associated primarily with the number of different categories reported for each causal relation. These data are shown in Table 4. The youngest children associated fewer categories of information with each type of causal relation. These results imply more variability in the content of inferences made by older children than by younger children. Furthermore, children tend to associate a greater variety of information, i.e., a larger number of categories, with Attempts to be friendly or unfriendly than with either Motives or Obstacles to friendship interactions. This tendency appears to decrease with age and indicates that older children expect as much variability in Motives for friendship interactions as in Attempts to be friendly or unfriendly. The implication of this result is that older children may be able to understand the behavior of others in a greater range of situations than younger children.

There were few developmental differences in which categories of information were associated with each causal relation. These results show that known categories play a similar causal role for children of different ages. Developmental differences in understanding friendship interactions arise more from differences in knowledge base content than from differences in organization of knowledge base content. The knowledge base for younger children contains fewer information categories than the knowledge base for older children. However, if a category is in the knowledge base, its causal role is the same. Increases in children's knowledge of the information categories relevant to

friendship interactions reflect a more elaborated and complex understanding of friendship. This development allows the understanding of friendship behavior across a greater variety of people and situations.

Summary and Conclusions

We have attempted to show how models of story comprehension and models of problem solving in social situations are consistent with the same theoretical perspective on the nature of the understanding process. Both domains share the assumption that actions are understood to be intentionally based, and that competent comprehension within each domain requires the construction of causal inferences among events. The episodic structure of events was discussed as a common link among research efforts in story comprehension, social cognitive development, and social skills training. Furthermore, we pointed out the importance of assessing children's conceptual knowledge of problem solving in social situations. This knowledge is the source of the child's content and evaluative inferences during comprehension of stories and actual social events. Finally, we discussed some research aimed at assessing developmental changes in children's conceptual knowledge about friendship. Changes in the content of the knowledge base were systematic and of an elaborative nature. This type of research methodology and content analysis seems to be a useful approach to describing children's knowledge. Furthermore, this type of approach can potentially lead to predictive models of comprehension that account for developmental and individual differences in the understanding of problem solving behavior, whether that behavior occurs in stories or in everyday social interactions.

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Table 1

Categories of Information about Problem Solving

in Friendship Situations

Major Classes and Description	Categories Within Each Class and Examples
I. PROTAGONIST'S STATES AND ACTIONS Statements that convey information about the internal states, cognitive actions, verbal actions, and direct actions of the protagonist.	A. Physical state--tiredness; sleepiness; hunger; thirst. B. General emotional state--anger; fear; shame; happiness. C. Situational states and ongoing activities--I was watching television; I want to be alone; I have to do homework. D. Feelings about friendship, the friendship object, or about anticipated outcome of attaining goal--I like him; So I'll have a friend. E. Specific actions and skill states for attaining the goal--playing, helping, hitting.
II. ROLE OF OTHER PEOPLE Statements that refer to the involvment of other people in the friendship situation. Component categories specify classes of other people that children's statements referred to.	A. Role of parents and family members--Mom said to play with him; Mom didn't like this kid so I couldn't play with her. B. Role of non-family, non-dyad others--My other friends teased me when I played with the new girl. C. Role of Friendship Object--The kid I wanted to be friendly with wouldn't share his toys; He didn't like me.
III. ROLE OF ENVIRONMENT Statements that refer to the environmental availability and accessibility of resources, including objects, activities, instruments, and locations necessary for goal attainment.	A. Availability of person to be friendly with--There were no kids around. B. Availability of basis for friendship interaction--We couldn't agree on what to do; We decided to play monopoly. C. Availability of common location for interaction--I went up to his house; I couldn't go to the park with the other kids.

Table 2

Knowledge Base for Friendship Interactions

for Each Age Group

Categories in Core Subset		
Age Six	Age Nine	Age Twelve
Specific Actions	Specific Actions	Specific Actions
Protagonist's Feelings about Friendship	Protagonist's Feelings about Friendship	Protagonist's Feelings about Friendship
Role of Friendship Object	Role of Friendship Object	Role of Friendship Object
	Availability of Common Location	Availability of Common Location
		Availability of Basis for Friendship
		Protagonist's Situational State

Categories in Non-Core Subset			
	Probability of Co-Occurrence with Core		
Categories	Age Six	Age Nine	Age Twelve
Protagonist's States			
Physical	.11	.21	.31
General Emotional	.17	.58	.75
Situational	.67	.68	Core
Role of Other People			
Role of Parent and Family	.33	.63	.63
Role of Non-Dyad Others	.33	.26	.75
Role of Environment			
Availability of Person	.61	.32	.63
Availability of Basis for Friendship	.39	.74	Core
Abailability of Common Location	.61	Core	Core

Table 3

Mean Probability of Motive, Obstacle, and Attempt Relation for Each Type of Information

Categories	Motive	Obstacle	Attempt
Protagonist			
Physical State	.78[a]	.47[a]	.00[a]
General Emotional State	.89	.28	.03
Situation State	.74	.50	.14
Feelings Toward Friendship and Friendship Object	.95	.57	.12
Specific Actions	.03	.00	1.00
Role of Other People			
Parent and Family Role	.64	.50	.06
Non-Dyad Others' Role	.47	.64	.00
Friendship Object's Role	.71	.68	.98
Role of Environment			
Availability of Person to be Friendly With	.36	.26	.89
Availability of Basis for Friendship	.04	.18	.94
Availability of Common Location	.00	.13	.97

Note. Maximum frequency of occurrence is 60.

[a]Frequency of occurrence < .15.

Table 4

Mean Number of Different Categories Mentioned as Motive, Obstacles, or Attempts for Each Age Group

Type of Causal Relation	Age Six	Age Nine	Age Twelve
Motive	2.7	3.4	4.6
Obstacle	2.1	2.8	3.0
Attempts	3.4	4.3	4.6

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